

## Notes 12/4 - Writing Equations of Exponentials

Parent Function  $y = a \cdot b^x$

y-intercept  $(0, a)$   
start point / initial amount

How you get  
from one y-value  
to the next  
consecutive y-value

Ex 1: Write the equation of the exponential function through the points  $(0, 5)$  and  $(1, 15)$

x	y
0	5
1	15

$$\begin{aligned} 5 \cdot 3 &= 15 \\ b &= \frac{15}{5} = 3 \end{aligned}$$

$$a = 5$$

$$y = 5 \cdot 3^x$$

Ex 2: Through the points  $(0, 12)$  and  $(1, 3)$

x	y
0	12
1	3

$$\begin{aligned} 12 \div 4 &= 3 \\ b &= \frac{3}{12} \end{aligned}$$

$$a = 12$$

$$y = 12 \left(\frac{1}{4}\right)^x$$

Ex 3: Through  $\left(2, 12\right)$  and  $(3, 24)$

Method 1

x	y
0	3
1	6
2	12
3	24

Method 2

$$y = a \cdot b^x$$

$$y = a \cdot 2^x$$

$$12 = a \cdot 2^2$$

$$12 = a \cdot 4$$

$$3 = a$$

$$y = 3 \cdot 2^x$$

Ex 4: Through  $(0, 3)$  and  $(4, 21)$   
 $a = 3$

x	y
0	3
1	
2	
3	
4	21

$$y = a \cdot b^x$$

$$y = 3 \cdot b^x$$

$$\frac{21}{3} = \frac{3 \cdot b^4}{3}$$

$$7 = b^4$$

$$b \approx 1.63$$

on Calc.

4, Math, 5:  $\sqrt{x}$ , 7, enter

$$y = 3(1.63)^x$$